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La Habana: A History of Society, Livelihood, Movement, and Land Use on the Iquitos-Nauta Highway

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Abstract

With increasing infrastructural projects and land titling in the Peruvian Amazon, many changes are occurring within small roadside communities. In this case study, we investigate how these changes impact livelihoods, land use, travel patterns, and social relations within the broader concepts of development, privatization of land, and commodification of nature. Specifically we focus on the *caserío* La Habana situated on the Iquitos-Nauta highway in the Loreto region of Peru. Semi-formal interviews and ethnographic methods were conducted to gather information on social organization, history of the community, land use practices, migration patterns, opinions on the road, and livelihood strategies. After data was collected it was analyzed and coded using excel and ArcGIS technology. We found that people moved to La Habana to connect with previously established family relations, job opportunities, and education services. The road was viewed as beneficial by all interviewed residents, but it was not recognized as the main draw to La Habana. Since the construction of the road, La Habana has undergone a series of adjustments including changes in livelihood strategies, including alterations in the balance between subsidence and income practices, and perceptions of land titles and land privatization. We conclude that increased infrastructural projects and privatization processes have large impacts on small *caseríos* both in physical changes and within the perceptions of their inhabitants.

Introduction

In this case study we seek to understand the impacts of road construction and land titling on rural livelihoods, land use, and social relations in La Habana, an urban *caserío* along the Iquitos-Nauta highway. Our goal is to view these impacts through the perspective of locals, specifically regarding how residents make a living, use land, and are socially organized. We aim to use information gathered from this study to answer the larger question of how infrastructure projects impact local life, including new legislation and changes in the land tenure system, in the Peruvian Amazon. This research is applicable to the larger concepts of development, including commodification of nature, privatization of land, and economy. The concepts of commodification the assignment of commercial value to something that was previously not considered commercially valuable and privatization- the transfer of a business, industry, or service from public to private ownership and control (Rist 2007) are particularly relevant because of the presence of the Iquitos-Nauta highway. The existence of the road also causes major changes in society, including society-nature relationships, and the way in which nature is commodified.

Modern roads are often synonymous with notions of opportunity and connectivity. In Peru, according to Harvey and Knox (2015), they are often viewed as tools that can solve problems such as social inequality, violence in politics, and lack of infrastructure. New roads frequently lead to population booms in surrounding areas and increased economic growth for small settlements in the region. Local inhabitants are able to participate in the new economy because the road provides connection to previously inaccessible economic opportunities such as larger cities, modern technology, and a larger marketplace. In hopes to achieve this growth, the

Iquitos-Nauta road was proposed in the 1960's by residents of Nauta, a small town, with the goal of regaining its status as an economically important port, which it had lost when the Marañón River shifted away from the town. Construction began on this 100 km road in the 1970's and took until 2006 to complete (Maki et al. 2001; Harvey and Knox 2015). The road opened previously inaccessible land that could be used for both agriculture and resource extraction, drawing new people interested in economic benefits such as fish farming, creating retreats away from the city, and the ability to sell agricultural and forest products at market in Iquitos (Harvey and Knox 2015). The first people to own land along the road were army generals involved in the construction process and wealthy landowners who did not reside on their land (Harvey and Knox 2015). Earlier attempts to motivate movement to the coming road in the mid 1980's, during Alan Garcia's first presidency, included incentives such as agricultural support loans and land titling opportunities, but failed to generate the expected economic growth (Maki et al. 2001). As population later grew along the road, settlements began to form and consolidate, leading to more health centers, recreational centers, and schools, all of which in turn increased the draw to the area (Harvey and Knox 2015). Today, more people who work the land are seeking to obtain ownership.

Impacts on lifestyles include changes in livelihood strategies: how money is earned and spent, including both monetary and subsistence sources of income, as well as 'buffers' and 'safety net' arrangements; changes in land use practices: management of agricultural lands, urban lots, and communal spaces, etc., and changes in access to services: education, markets, water, electricity, transportation, communication, etc. La Habana provides a good example of the aforementioned changes because it existed both before and after the completion of the

Iquitos-Nauta highway, is currently in the process of land titling, and is composed of residents from varying backgrounds. This allows us to create an accurate depiction of how development brought about by road construction has changed the way of life in *caseríos* along the Iquitos-Nauta highway.

Livelihood strategies vary for those who have settled along the road, but previous research reports that most people are heavily dependent on resource extraction from forests that flank the road (Maki et al. 2001). DISAFILPA, a department of the Ministry of Agriculture, notes that most resource extraction is being replaced by agricultural production along the road. Cultivating *chacras*, which are small, traditional, agricultural plots, is a common way to make a living along the Iquitos-Nauta highway because *chacras* provide food for subsistence and the road allows for easy access to sell crops at market (Maki et al. 2001; Harvey and Knox 2015). Other livelihood strategies practiced along the road include raising livestock, working for wages, self-employment, forestry extraction (such as extraction of timber products), or a combination of these (Porro et al. 2014). Commercial fish and chicken farming have become particularly popular along the road as government-supported income strategies. For example, ninety new *paiche* farms have sprung up along the road since 2018 (Cambronero 2019). A *paiche* is a freshwater fish native to the Amazon region and South American basins. They are among the world's largest fish and are the largest scaled fish in the Amazon basin reaching over 3 meters in length and 200-400 pounds. *Paiche* are being over hunted in the wild for their meat, causing a recent increase in *paiche* farms to continue providing food without harming the natural population (Núñez 2011).

The social characteristics that define communities in the Peruvian Amazon vary greatly, but there are some discernible patterns. Families are typically large and many individuals choose to remain near or with relatives into their adult lives, both because family is generally an important value to Peruvians and because families often work as one economic unit (Chibnik 1994). *Mingas*, or community events in which residents come together to complete communal work, are a common aspect of social life (Chibnik 1994). Education is generally considered very important to individuals within the Peruvian Amazon; access to good primary and secondary schools is often a draw to certain places for parents who hope to provide more opportunities for their children's future. Political roles exist within communities, such as the *teniente gobernador*, a political leader who oversees helping obtain land use titles in the community. *Teniente gobernadores* can also function as a police officer who responds to conflicts that occur within their community (Chibnik 1994). In La Habana, the municipal agent is another political leader who serves as a representative of their community and helps maintain social order and communal projects, as well as helping their community members obtain land titles.

The land tenure system in the Peruvian Amazon, controlled by DISAFILPA in the regional Ministry of Agriculture, assigns two general types of land use permits: certificates and titles (Chibnik 1994). Titles grant the possessor permanent rights to the land and above ground resources. Titles are most often granted to those who own commercial estates or are officially recognized as native communities (Chibnik 1994). These land permits can be either communal or individual. Communal land titles are granted to certain ethnic groups or social classes in Peru, namely those who identify as "peasant" or "Native Amazonian" (Chibnik 1994; Velasco 1969). However, small peasant communities that consist of less than fifty families, like La Habana, are

ineligible to become peasant communities and unable to apply for communal titles; these communities can achieve a legal classification of *caserío.* To secure titled land, members of a *caserío* apply for individual titles, which can be taxed by the state (Chibnik 1994).

This bias towards indigenous peoples and wealthy commercial owners has left behind a population described as the "invisible Amazonians," non-Native Amazonians who live in small rural or urban zones who are ignored by both the state and outside NGO's (Cawa 2016). An NGO is a non-governmental organization, commonly known as a non-profit organization. In the past, people who fell into the category of invisible Amazonians were often granted certificates, which allowed for temporary use and rights to land, instead of titles (Chibnik 1994 and Cawa 2016). Today certificates are ordinarily given to those who are working abandoned land as a placeholder for a title, a heritage of the 1969 agrarian reform slogan 'land to those that work it' (Velasco 1969). According to DISAFILPA, this policy changed five years ago in response to climate change; land no longer must be worked, it can be saved for conservation reasons. Because of this, taxes must be unpaid for five years before a title can be transferred to a new owner, so a certificate grants rights to the people who work the land during this "in between" state.

Understanding the inner workings of La Habana will be beneficial to our understanding of how changes occurring in the Peruvian Amazon due to increased infrastructure and land titling affect small *caseríos*. We will provide insights about development and privatization, specifically from the perspective of locals. The information gathered during this case study will provide a baseline for all further studies aiming to understand the larger concepts of commodification, development privatization, and economy within small-scale settlements. Further, it intends to

feed into literature concerned with the effects of modernization as mentioned above. We hope that our case study can serve as a basis for future researchers who can study the importance of our broader concepts on a larger scale; studying the effects of increased urbanization and the Iquitos-Nauta highway on the Peruvian Amazon. We hypothesized that although the road did not directly initiate the formation of the *caserío*, it has large effects on the way that current La Habana residents live on a daily basis.

Methodology

Specific Aims and Objectives

The main objective of this study is to understand the impacts of road construction and land titling on rural livelihoods, land use, and social relations in the Peruvian Amazon. To address this overarching objective, we created five specific objectives (Appendix X, Table 1). The first one is to understand how land is used in La Habana. Within this topic we are particularly concerned with *chacras*: how the land for the *chacra* was acquired, its location and size, and what is grown on it, as well as additional uses of land: communal land, forest cover, *purma*, or urban/building areas. The second specific research question focuses on learning what livelihood strategies are used by La Habana residents. Within this question the emphasis is on what activities are done to make money, which activity provides the largest income, how money is spent, and how livelihood strategies have changed over time, particularly: before and after the road. The third focus of this case study is to discover how La Habana is socially organized. Emphases of this question include how many people live in each household, how many children couples have, what political roles exist in La Habana and who holds them, and how La Habana is connected to other settlements along the road. Fourth is to recognize how the Iquitos-Nauta

highway has impacted La Habana in terms of the benefits and consequences of the road, and opinions of the road. Lastly, we were interested in the historical background, migration patterns and local history of La Habana in relation to the infrastructural development of the road; and changes in the area before and after the completion of the road. Within this objective was discovering where people came from and how those places affect their current lifestyles, specifically regarding livelihood strategies, land use methods, and social organization.

Description of Study Site

La Habana is a *caserío* at km 54 on the east side of the Iquitos-Nauta highway in Loreto, Peru (Figure 1, Figure 2). La Habana's name originates from the small creek that flows through the area, so named by a liquor producer in 1960 when required to name the river on the land from which he extracted his sugarcane. Habana was the name of the road in Moyobamba from which he came. Families began arriving in La Habana in the late 1980's and the *caserío* had its largest population, around fifty households, between 2000 and 2004. La Habana was originally called Nueva Mayoría after former President Fujimori's party, but its name was officially changed in 2005 due to the end of his regime. On official maps, however, La Habana still appears as Nueva Mayoría.

The urban zone of La Habana, as demarcated by the Ministry of Agriculture, is 64 meters along the road and stretches back 1500 meters, 9.6 ha in total. Approximately 26% (24,960 m^2) of the land nearest to the road is populated, consisting of thirteen families and their houses, two small school buildings, and free and communal spaces (Figure 3, Figure 4). Approximately 14% (13,440 m^2) of the land is currently unpopulated but is measured out for future lots. Approximately 40% (38,400m^2) of the land consists of new growth forest, called *purma,* and

approximately 20% (19,200 m^2) of land towards the back of the property is old growth forest, locally called virgin forest (Figure 5). The first 25 meters of land on both sides extending from the center of the paved road is government land owned by the Department of Transportation and Communication, but there are several *casitas* and stores as well as crops located there. Residents residing or working in this area will be required to relocate if asked by the government.

As of April 2019, the urban area of La Habana is in the process of getting individual titles as a *caserío*. The residents work with their municipal agent who works with the Ministry of Agriculture in Iquitos. La Habana residents do not know how much time or money is required to secure the titles, but DISAFILPA has said that it typically takes around seven months. There is not enough free land within the urban area of La Habana for all families to cultivate *chacras*, so many residents use agricultural land on the west side of the highway in what is called La Habana II (Figure 6).

La Habana II is an expanse of agricultural land, some of which is owned and some abandoned, on a 10 km trail beginning at km 51.5 of the highway (Figure 6). This land is composed of *chacras*, *monte alto* forest, *purma*, and pasture. Four La Habana residents work land between km 2 and 3.5 in the 10 km trail. Three residents have *chacras* on land that has been abandoned; they are currently *posicionarios,* meaning they are soliciting for titles to those lands. One of these three men is also a caretaker of an agricultural plot, containing cattle and pasture, for a man who does not live in La Habana II, but still pays taxes on the land. The fourth La Habana resident is not a *posicionario* but has an agreement with an absentee landlord to cultivate a *chacra* on his land. The first 2 km of the 10 km trail is *purma* on either side. After the 2 km

mark the land is open agricultural plots containing crops and *casitas*. Many non-La Habana residents, including illegal squatters, live on or work the neighboring plots of land.

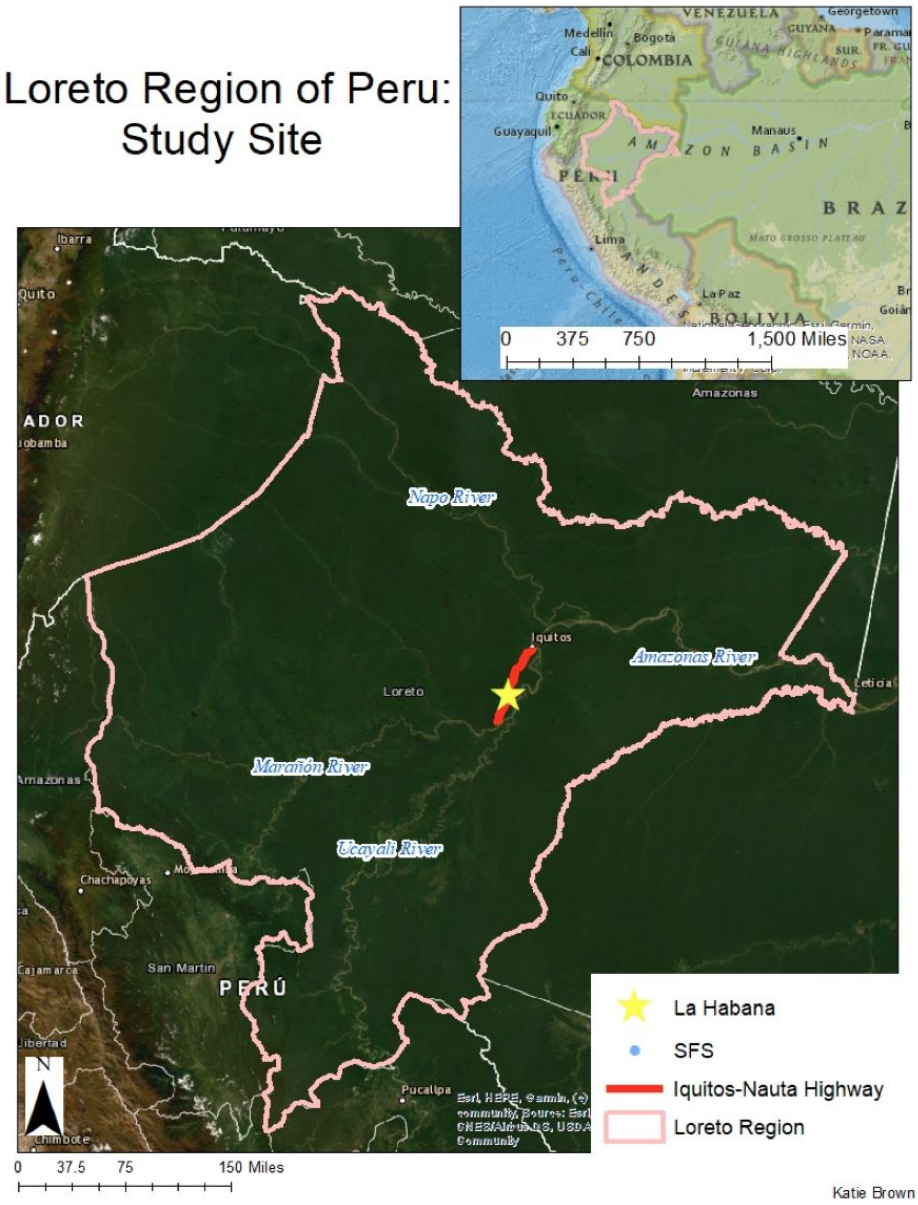


Figure 1: This map shows the study site where we conducted my research in the Loreto region of Peru. The map shows the major rivers and the Iquitos-Nauta. An inset map is included showing the northeastern position of the Loreto administrative boundary in Peru.

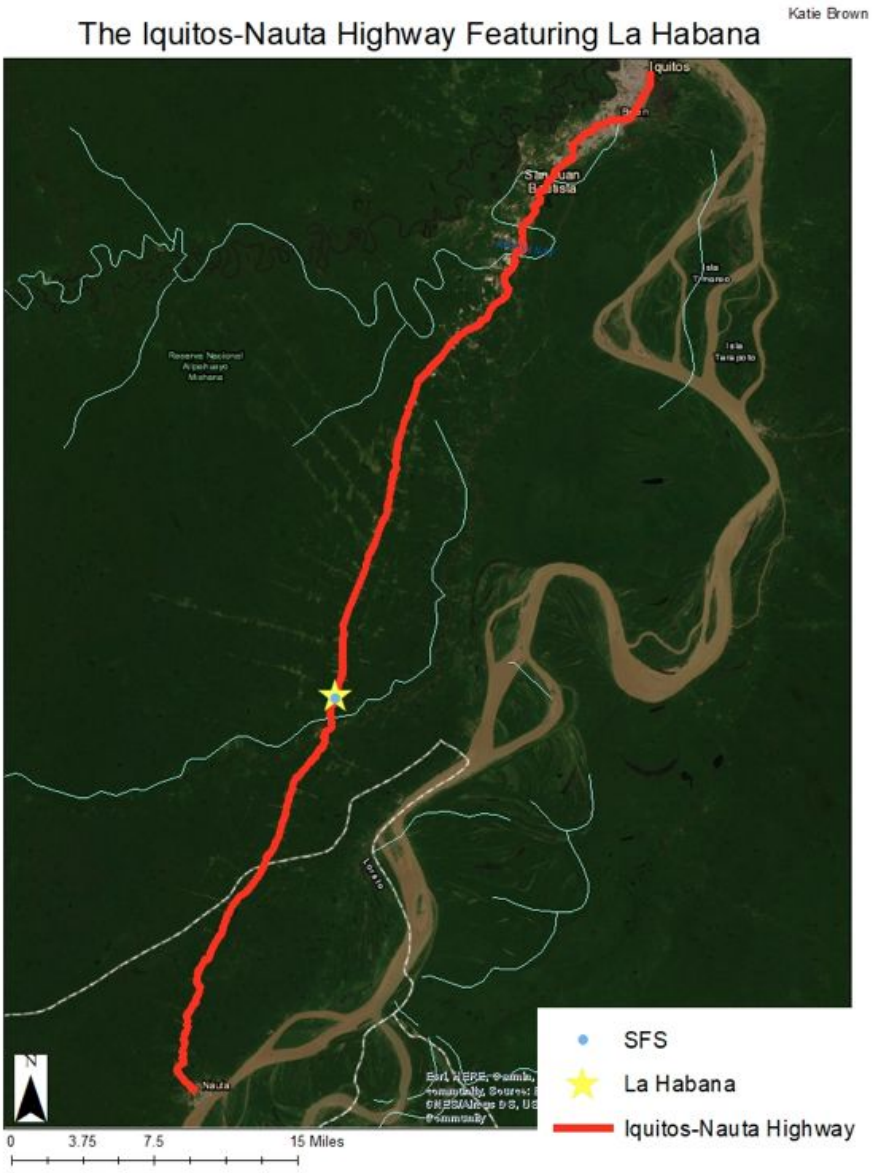


Figure 2: This map shows the Iquiotos-Nauta highway. It is a 100km long road connecting the cities of Iquitos and Nauta and it is the only road in the region. It was finished recently in 2006.

Figure 3: The area of La Habana that is populated with houses, schools, soccer fields, and communal spaces. The small creek running through the community is the stream in which La Habana is named after. Map created using Google Earth, image from 2003.

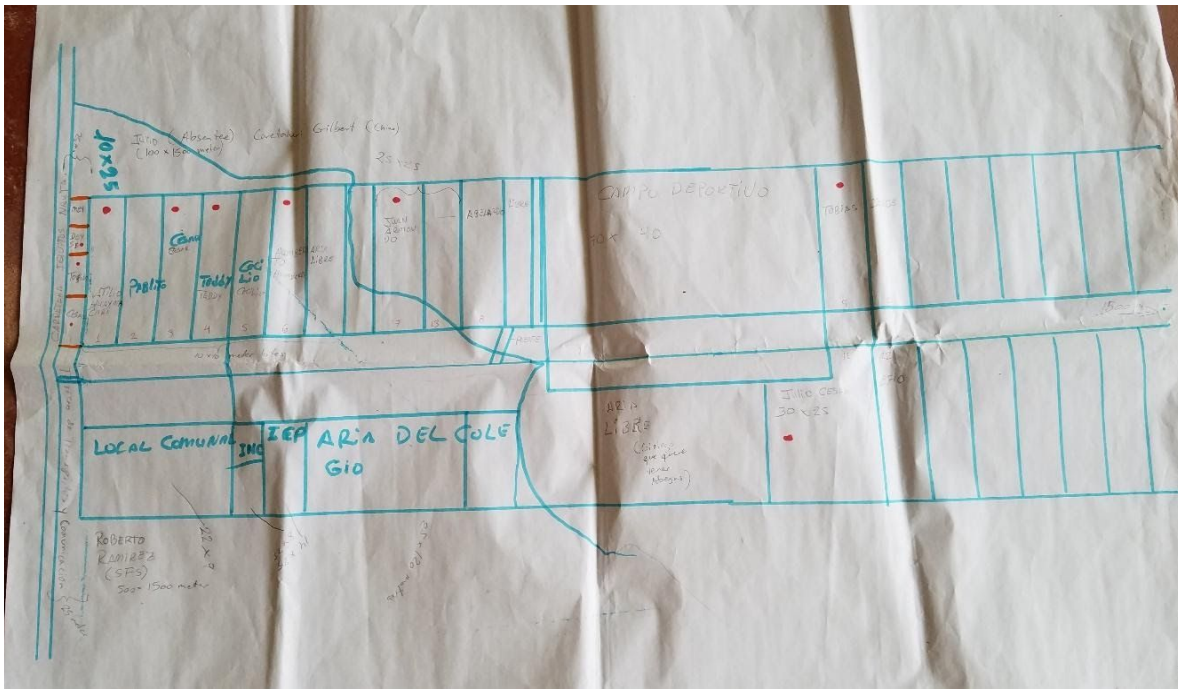


Figure 4: A hand drawn map of the front portion of the *caserío* La Habana, drawn for us by the municipal agent of La Habana.

Figure 5: The *caserío* La Habana that stretches 64 m along the Iquitos-Nauta highway and extends 1500 m back. This is what is considered the urban area of La Habana. Map created using Google Earth, image from 2003.

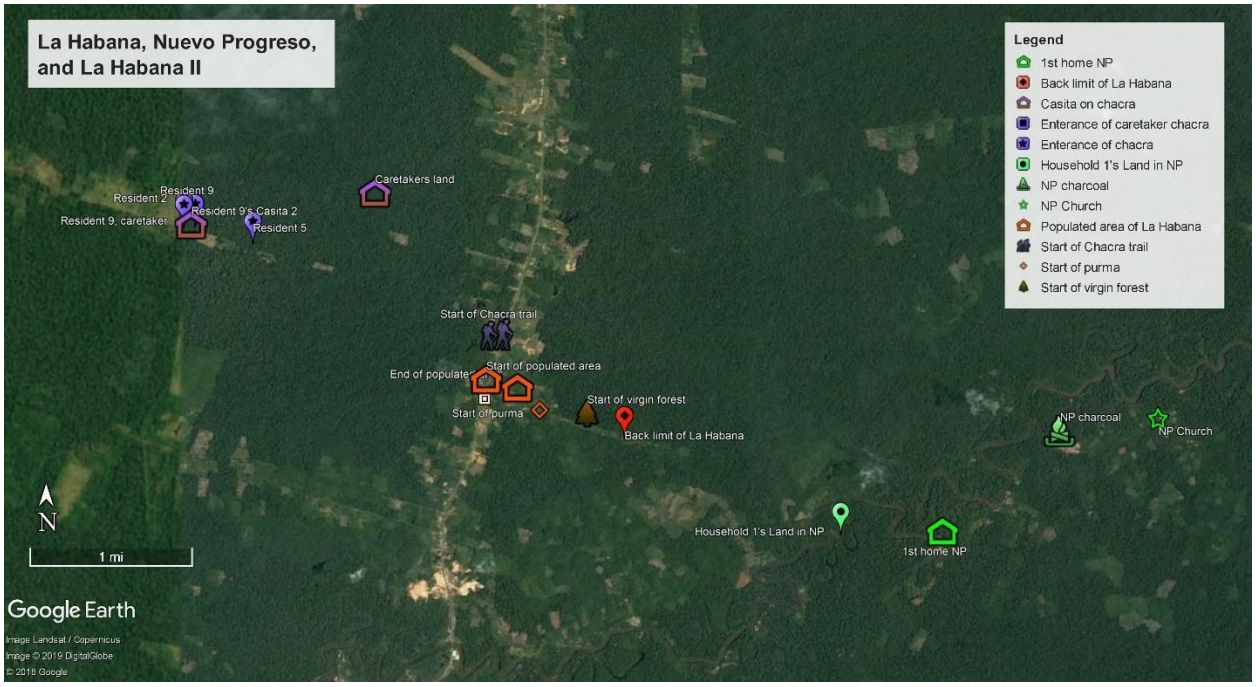


Figure 6: La Habana, La Habana II, and Nuevo Progreso. The purple symbols represent points in La Habana II, the orange symbols represent points in the *caserío* La Habana, and the green symbols represent points in Nuevo Progreso. Google Earth image from 2003

Data Collection

We collected data in the community of La Habana from April 8, 2019 until April 28, 2019.

We employed participatory mapping (contemporary) to show the composition of La Habana (Figure 2) and collected maps from the Ministry of Agriculture on which to plot GPS points. We showed a 2016 map of the Loreto Region, "Presiones y Amenazas sobre áreas naturales protegidas y territorios indígenas, deforestación 2000-2013," to the interviewed community members who used it to mark where they and their ancestors came from and moved to. This map was used as a tool to guide discussion about why residents decided to move to La Habana and similarities and differences between La Habana and their previous place of dwelling.

An elder resident gave us a tour of La Habana, during which we took photos and notes to encapsulate the general environment and layout of the *caserío*.

We conducted semi-formal interviews with each participating family, interviewing eight of thirteen families who live within the urban center of La Habana. We also conducted interviews with two *moradores*- or residents- who do not live within the urban center of La Habana, but whose land does fall under La Habana's jurisdiction. We decided to interview these two to gather insight onto what La Habana was like in the past, specifically to be able to compare the current La Habana to their memories of La Habana earlier on and without the presence of the road. We interviewed people aged 30 to 72. In general, the men of the household spoke more frequently and led the conversation. However, we were able to acquire information from some women, especially those who were older. We used these interviews to collect information on social organization, the history of community, land use practices, migration patterns, opinions on

the road, reasons for living in La Habana, and livelihood strategies. A general interview guide was loosely followed for each interview. We created a hand drawn map with the information about where the residents and their ancestors came from (Figure 7). We conducted more in-depth interviews with select families and individuals in order to clarify or collect more specific information on things the family or individual was familiar with. Follow up interviews were completed with the municipal agent and long term residents.

We conducted key informant interviews with the municipal agent of La Habana, DISAFILPA, and with elder residents. They had specific in-depth knowledge on the titling process and history of the *caserío*. *Chacra* visits, in which we observed land use, were done to obtain further information on land use practices, including composition and management of *chacras* and *purmas*.

We took GPS waypoints in the urban area of La Habana and agricultural zones of La Habana II to denote *casitas*, land entrances, plot borders, and important structures. These GPS points were overlaid onto a 2003 Google Earth satellite image of the area to create an overview of La Habana (Figures 3, 5, and 6).

We visited Nuevo Progreso, a *caserío* in which a family in La Habana previously resided and some still keep land in, in order to compare and contrast lifestyles, land use, livelihoods, and social organization between it and La Habana. We used the information gathered for comparison as well as to investigate people's motivations for moving away to La Habana. First, we visited the family's agricultural land in Nuevo Progreso, which they still own. Then, we visited and

observed the main urban zone of Nuevo Progresso. We conducted two semi-formal interviews with Nuevo Progresso residents.

Semi-formal interviews provided a balance of power between interviewer and interviewee by allowing us to seek the information we wanted without limiting the answers that the interviewees could give (Dewalt & Dewalt 2002). We chose this style of interviewing as opposed to a more rigid style in order to make it less likely that we would miss topics that interviewees find important that we may not know about. Being semi-structured, however, it still provided consistency among the interviews. Because of our previously specified outline, however, we may have unknowingly provided interviewees with leading questions. Finally, biases may have been present due to the language barrier that exists between the English-speaking interviewers and the Spanish-speaking interviewees and the way that questions and answers were translated.

Study Limitations and Constraints

This case study may have been limited by the time constraints. We only had one month to plan, carry out, write about, and present on this case study. More time would have allowed us to go more in depth. We would have liked to visit multiple settlements that La Habana residents came from as well as conduct further interviews with all members. The project would be especially interesting as a large scale, multi-community case study. The small sample size was not necessarily a limitation of our study due to the fact that the small sample size allowed us to dig deeper into the histories of La Habana. This may have allowed us to have greater insights than a larger sample size would have.

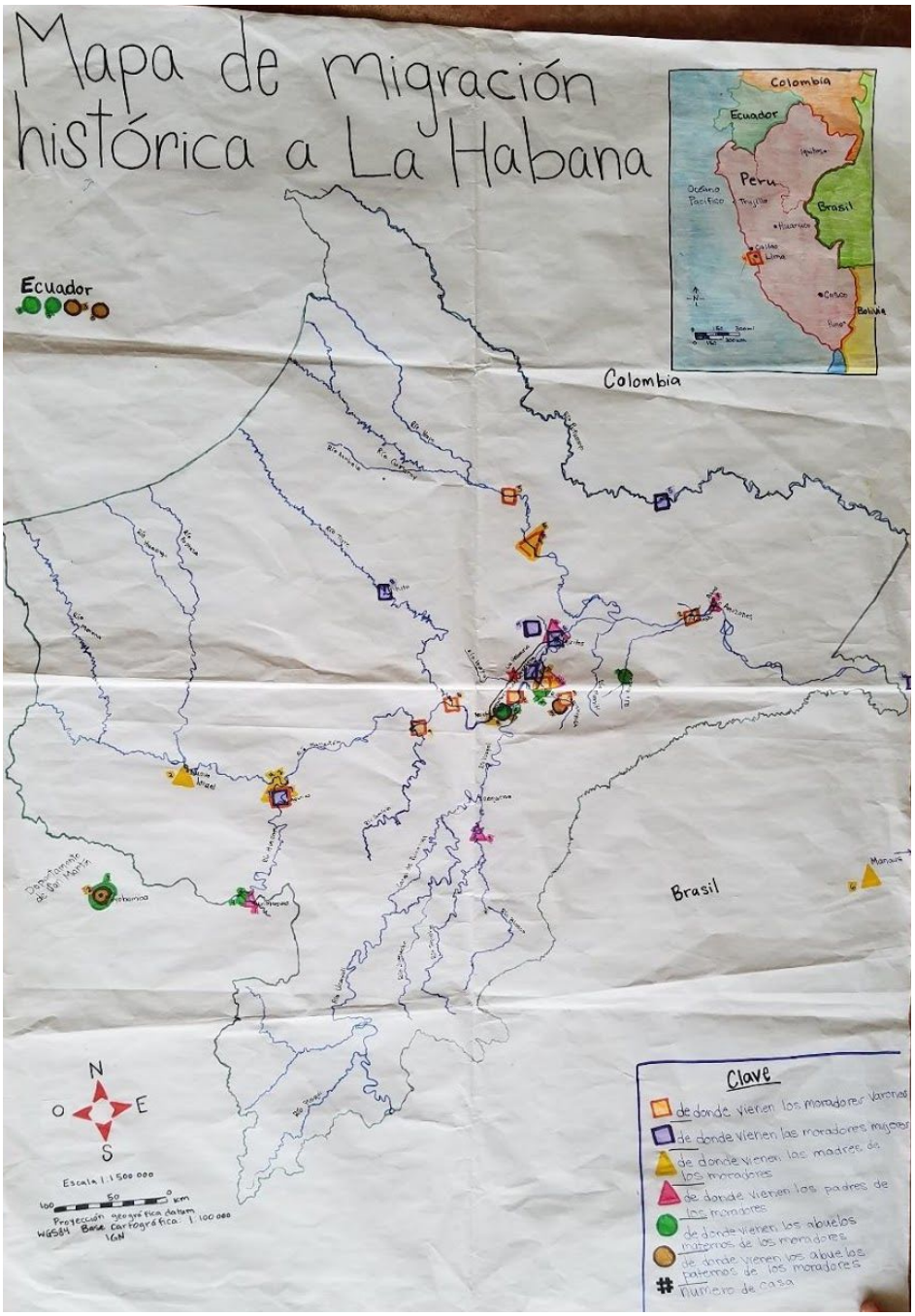


Figure 7: A map of the Loreto region of Peru showing the places from where current La Habana residents, their parents, and their grandparents came.

Data Analysis

After each interview and visit to La Habana, data was debriefed and compiled into "general" and "household" notes. We recorded information from interviews and tours in documents created for each household that volunteered to be interviewed (numbered 1-9). To codify our qualitative data, we transferred and organized it into an excel spreadsheet to pair and compare answers about livelihood strategies, land use, social positions, and place of origin etc. The purpose of the data analysis was to identify patterns, outliers, narratives, and significant data points within the results.

We chose which data to discuss based on two main criteria: our research questions and the broader concepts we sought to discuss. We specifically looked for patterns within the data, or answers we received several times that confirmed themselves. We selected results within the categories of livelihood strategies, land use, social organization, and the Iquitos-Nauta highway that somehow related to the concepts of development, privatization, commodification, and economy.

Data was later analyzed using GIS technology to create comprehensive maps showing the study area, as to organize the data collected on the movement patterns of La Habana residents. I performed spatial analysis to look at my spatial findings and conceptual findings. Maps were made showing the study site as well as to track movements of current La Habana residents throughout their lives, and overlaying this information with river layers finding the most likely routes of travel used by individuals. The conceptual findings are based on my notes from the semi-formal interviews. The spatial findings are based on the maps that I create.

Conceptual Framework

Land rights customs in Peru are changing as land titling processes across the nation are becoming more systematized and formalized. Traditionally, the Peruvian Amazon has used customary and informal processes, characterized by respect and local authorities, to secure land rights among people and communities (Kerekes and Williamson 2010), a system which was confirmed by La Habana residents. The reason behind the institutionalization of land rights is an attempt to develop the economy; if more people invest in the market, the economy can grow. Many citizens of Peru, especially in the Amazon region, do not officially own property and therefore do not have collateral to offer banks in order to receive loans that could be used for investments. In theory, titled land can be used as collateral for loans, hence the current movement toward the privatization and titling of lands (Kerekes 2008).

A capitalist form of economy can be loosely defined as a "mode of production," meaning it is a way to produce goods (Stilwell 2002). This form of economy is characterized by certain distinctive features. One is a separation of labor from ownership of the means of production, resulting from the dividing up of labor to produce more goods for the market. Those who work to produce certain goods no longer get to make decisions about how that production happens, separating workers from both labor and products; this concept is known as alienation (Caceres 2015; Stillwell 2002). Another feature is the formation of a working class that is dependent on the sale of its labor power. This occurs because of the prominence of wage labor in the capitalist system where members of the working class lose control of their life because they become dependent on the money they make. Those who control the means of production acquire more

wealth and power, whereas the working class holds a small amount of power (Christoffersen 2019).

Resulting from this economic model is a change in social life. The economic model affects how societies live and function and believe more than the beliefs impact the economy. This means that the economy influences society more than society influences the economy. This is what Karl Marx calls the base-superstructure model, and it differs from nearly every other model because it attributes the foundations of a society to that society's economic model. According to Stilwell, the capitalist economy is responsible for shaping all of the capitalist society and leading to commercialization and commodification (Stilwell 2002).

Commodification is the assignment of commercial value to something that was previously not considered commercially valuable (Rist 2007). For example, what was once a forest that was used communally for food, medicine, and resources is now a store bank for certain resources, which hold monetary value, to be extracted (Caceres 2015). What once were small *chacras* used for subsistence fall under pressure to produce more product to be sold. Even people, who once may have joined together in familial labor, become a tool to produce more for the market.

Behind the desire for economic growth is the broader, more abstract concept of "development," which generally holds the goal of increasing production of commodities to meet market demand (Rist 2007). The "developed vs undeveloped" dichotomy came to be shortly after World War II and holds that economic features of "developed" countries should be incorporated into "undeveloped" countries so that the latter can advance towards a more modern society (Christoffersen 2018). The idea that "developed" ideals should be incorporated by

"underdeveloped" countries tends to be largely based on western ideologies (Rist 2007). Many countries desire more development in order to gain economic benefits; in an attempt to do so many of the adopted "developments" manifest as infrastructure projects. Infrastructural projects can increase access to places, people, and trade, increasing economic opportunity. They can also cause detriment to the environment and to "non-Western" cultures (Hemming 2008).

Without doubt, acting upon the concept of development seems to bring drastic changes to any area. This is relevant to our case study because of the existence of the Iquitos-Nauta highway. Since this highway is relatively new, many people still remember how life was before the highway was completed, and therefore are able to see changes that have occurred due to this "development." This includes a migration to areas with modern infrastructures, including power and mobile-coverage, higher prevalence of wage labor, and increased and faster access to medical care and cities. As further development occurs it may also begin to change the way people think about their land and life, which shifts the economic structure and may lead to the commodification of nature and products (Robbins 2012). The underlying economic system and outside perceptions of social order may also or instead be the motivation for commodification of nature and products, which then leads to a change in the way people think.

This broad framework of concepts relates to our study because of the way that the Iquitos-Nauta highway and land titling events affect the *caserío* La Habana. We are specifically interested in operating the research in a way that allows us to see changes in land use, livelihood strategies, and social organization based in the framework of these larger concepts.

Findings and Discussion

Overall, we found that our hypothesis was supported by the information we gathered. Our interviews and other data suggest that the road has introduced new political and socio economic institutions, which have changed livelihood and land use strategies of La Habana and may lead to further sociocultural changes in the future.

Privatization of Land

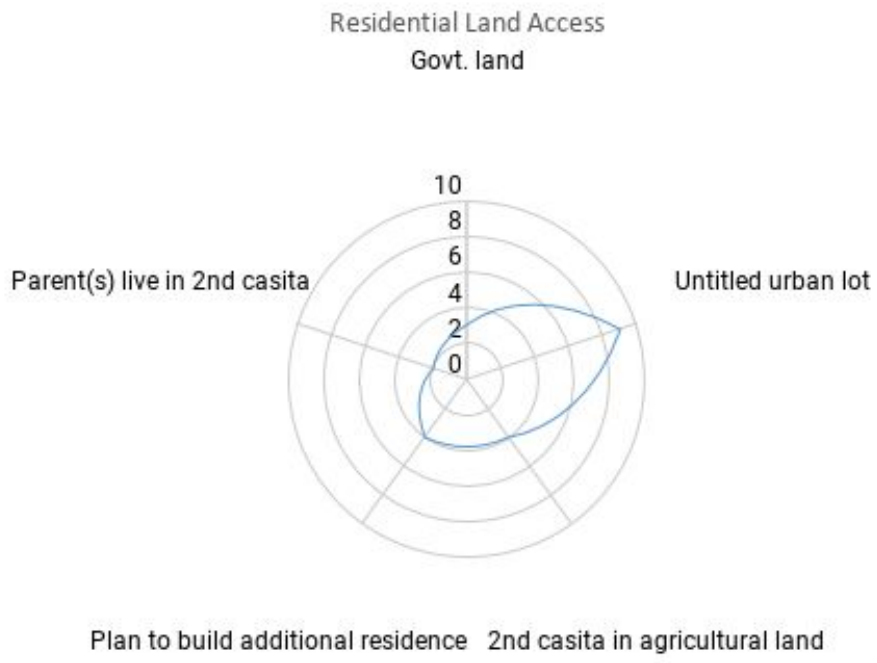
When the road was constructed, much of the land along the road was converted into large private parcels, leading to the privatization and commodification of land. Land became limited; land became property, something that must be bought, sold, and legally owned.

The limited availability of land has posed a new challenge to the residents of La Habana. As we found in interviews with older residents, this was not the case before the road. Many residents who had been in the area prior to the road's construction independently expressed to us that there used to be fewer established *caserío,* and people generally lived farther apart. They described an environment characterized by *monte alto* with abundant resources where nearly everyone had a *chacra*. By contrast, the current population density of La Habana's urban center is 1 home per ~14.3 m (16 casitas in 230 m). According to long-term residents, 30-50 families lived in the center where *purma* is now between 2001 and 2004, but many left around 2004 when the road was nearing completion. The most common explanation for why so many families left was that there was not enough land to cultivate.

To address the problem of limited space, residents make use of all land available to them for both residential and agricultural purposes. This land varies in ownership status and,

accordingly, in degree of accessibility (Figure 8). Several La Habana residents have agreements with absentee landlords in which they have permission to use and/or live on land owned by absentee landlords and sell crops produced there in exchange for maintaining it or are being paid as caretakers. This practice is common among people who live along the road. The residents of La Habana also make use of untitled lots, untitled lots under the jurisdiction of other *caseríos,* and have stores, *casitas,* and plantains on the government-owned land right on the side of the road. Only two residents in La Habana hold titles for land, both of whom inherited the land which is located outside of the urban center. One of the two lots is currently lived on, and neither are currently used for agriculture.

A)



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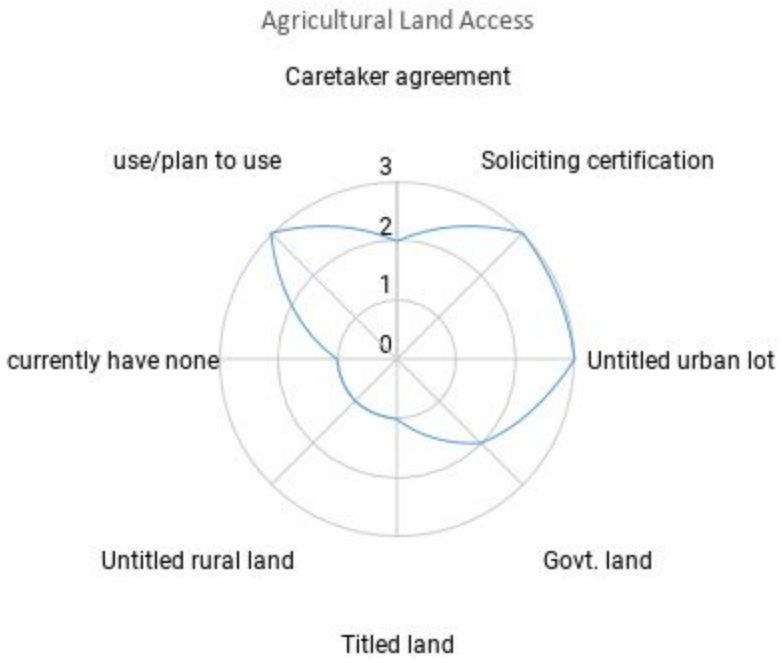


Figure 8. Accessibility of the land used by residents of La Habana, split between residential and agricultural as reported by eight households and two previous residents of La Habana. Counted households were all within the urban center. These results exclude La Habana *moradores* who reside exclusively on another's property as caretakers. **(A)** focuses on residential land access and use, showing the number of responses out of ten households. **(B)** focuses on agricultural land access and shows the number of responses out of ten households. This land includes all pieces of land which a specific resident or household has claimed as theirs for the purpose of production, including *chacras*, agroforestry, pisciculture, and small orchards or gardens. Also included in these counts are any fallow agricultural lands which residents have access to. Additionally, we counted the number of residents who either use more than one piece of agricultural land or plan to have another in the future (use/plan to use). One resident who currently has no agricultural land of his own works for another resident on their agricultural land.

All those we interviewed who do not already hold land titles are seeking them and view titles as a necessity. As described in Methodology, current legislation restricts the *caserío*'s eligibility to individual titles, not communal. Generally, there was much uncertainty about the titling process from La Habana residents. No one was sure of how long the process would take or what the monetary cost of this process would be. Residents estimated the cost to be anywhere between PEN 10 and 400, but most were entirely unsure. DISAFILPA officials told us that the total cost would be closer to PEN 1500, but this figure may be for rural *caseríos* and differ from the cost per individual of an urban *caserío*. They also mentioned that the municipal government may cover part of the cost.

Regardless, all interviewees we spoke to believe the benefits of titling outweigh the costs. In addition to economic benefits such as bank loans, every respondent asked about the benefits of land titles mentioned that titles would bring a sense of security, ensuring that no one could take away their land if they legally owned it. With a title, no one would be able to move into their lot if they ever needed or wanted to leave and return at a later date. Our key informants both mentioned squatting as a problem. Another concern was that wealthier parties may eventually solicit a title for land that was already being worked on by impoverished residents and evict them. Although we have no direct measure of this, a real threat lies within this issue. In our time here, we came across an unnerving anecdote from an eyewitness who described seeing a group of squatters evicted from their houses. She described seeing a group of officers in riot gear turning their backs to the row of homes as another group of shirtless men with their faces masked in cloth approached the homes. When we drove by the spot, we found the houses leveled and later saw a woman picking through the rubble. The destruction of the houses as supported by the

police officers was an eviction of squatters who had been living on land not legally owned by them. This eviction was additionally mentioned in brief by an interviewee in the context of land titling and specific problems facing the area. In this story, we see a manifestation of the literal dangers that came as a result of land becoming a limited commodity. Titling is therefore important for the people to feel in control of their land, and thus their livelihoods as well as the wellbeing of their children, in this newly privatized environment.

Thus, we can consider the road as a catalyst for rapid change, an insertion of a new system over the old that brought, among other things, more aggressive land ownership and more exclusive land use. By comparison, land availability in Nuevo Progreso appeared to be less of an issue. Houses were more spread out, people had agricultural land within community limits and beyond, and are currently not competing with wealthier parties for ownership or use of the land in their jurisdiction. Household 1 shared that their agricultural land in Nuevo Progreso is untitled and has been left fallow for fifteen years, but nobody has moved in or tried to work it because there is an understanding among those who live nearby that it is theirs. There is even a trail that goes through the land that their neighbors use, which sharply contrasts the “private property” and “no trespassing” signs observed on some property fences along the road. This unspoken system of respect likely reflects what existed prior to the road in the area of La Habana.

Interestingly, in Nuevo Progreso, people were also trying to get land titles, despite being located in a rural zone. Based on the interviews we conducted there, it seems none of their land is titled by either *moradores* or absentee landlords. As one resident told us, historically land everywhere was free and accessible for all but now everyone is trying to get a title. We do not

know the exact reasons why they feel pressured to title their land, but it may be because of the changing conception of land, coming from the relative nearness of the road.

Economic benefits of titling were also mentioned by the residents of La Habana, specifically, being able to get support from the bank in the form of loans and accumulating credit. In this, they discussed being able to invest in their property once it becomes legally theirs. For example, a few men discussed being able to start agro-businesses with their property. One resident in particular wants to invest in his fish ponds and start making his own fish food. Residents also mentioned several public works projects.

However, titling may not have its intended effects. One paper based on small communities elsewhere in Peru found that titling agricultural land may not increase access to credit and is not a guarantee of access to loans (Kerekes & Williamson 2010). Their results suggest that there may not be an increase in granted public sector loans, and private sector loans have much higher interest rates and often remain practically inaccessible. Furthermore, many Peruvian loans require additional collateral or cosigners, which decreases citizens' ability to get a loan with only their land. The authors also suggest that enforcement may not be sufficient to guarantee the security of property the residents of La Habana seek. Thus, government-granted titles may not bring all or any of the desired benefits.

Another unintended consequence of land titling may be that people will no longer be able to migrate as freely, which will be discussed further in the Travel and Movement section of the results. The pre-existing conception of land present in the Peruvian Amazon may be fundamentally different from this new system's conception of land, which is based on the

assumption that land is a limited commodity. According to a study conducted elsewhere in the Amazon, when compared to highland peoples, lowland peoples traditionally see land as a source of subsistence to be used based on social structures, which tend to be more egalitarian and autonomous (Christofferson 2014). A La Habana resident from Lima, where land is already more limited, claims that people from Amazonia do not realize the value of the vast abundance of land and space they have relative to other regions of the world. We heard similar comments from Andean people who were not included in this study. Comparatively, these individuals have a very business-like and entrepreneurial look on this abundance of open land. They talk about the wealth of nature here whereas the locals we interviewed additionally spoke of nature in terms of subsistence.

Movement and Travel

We found that spatially, most people have migrated from rivers in the Loreto region to the road towards the road. The general pattern of movements have been from the borders of the Loreto region to a more central location, and closer to the road. The exception to this pattern is with resident four, who moved out of the Loreto administrative boundary and then back to La Habana (Figure 9). Rivers are the most likely path of travel because most of the land in this region of Peru is dense rainforest. It is very difficult, dangerous, and slow to navigate through the Amazon Rainforest, and since there is no road the rivers are the likeliest ways to travel.(Figure 10). The rivers found that were most likely used as the major travel routes were the Marañon, Putumayo, Amazon, Tigre, Ucyali, Cushabutay, and Napo (Figure 11). These are all large rivers that are well known and well-navigated in the Peruvian Amazon, especially the Marañon, Ucayali, and Amazon. Based on the concentration of dots in particular areas and the path to La

Habana it appears clear which rivers were used for travel. It also appears that the majority of residents traveled on the same rivers, particularly the Marañon.

Something we noticed as we gathered personal histories is that La Habana *moradores* come from various places within the Loreto region, and we did not speak to anyone who had stayed in the same *pueblo* all their life. Generally, people lived in several places throughout their lives and have traveled various times throughout their lifetimes (Figure 9). Furthermore, only two people work the exact same parcel of land as their parents, and while everyone has Amazonian ancestry, some also had ancestry from other regions of Peru as well as several neighboring countries. As land availability has historically not been an issue for this region, it seems as though people have not previously been limited to one place. A family could practically move anywhere along the river system and have available land to use and be able to sustain themselves.

Thus, in the Peruvian Amazon at large, people are not typically tied to one place, but this may change as the land tenure system becomes more privatized. People may find themselves boxed in when land is all parceled out. It may prove harder to leave land once an individual or family is tied to it through investment and taxes. For example, one *morador* had to return to La Habana after living away for his entire adult life to care for land he inherited from his father. Additionally, as taxable property, land will then have to be bought and sold. As a consequence, it will not only be harder to leave but also to find new land that is free to settle on. Abandoning land once titled could leave one with a debt of unpaid taxes and potentially ruin any economic benefits with the bank.

Conceptually we have found that there will likely be less migration happening in the future due to the change of land ownership concepts in the Peruvian Amazon. Land ownership is becoming a more largely enforced law in the Peruvian Amazon. We also found that many residents choose to stay in La Habana because of benefits provided by the road, although no La Habana resident credits the road for the main reason why they moved to La Habana. Generally, La Habana residents tended to find more benefits about the Iquitos-Nauta highway than disadvantages.

La Habana residents have moved for a variety of reasons such as escaping drug trade, death in the family, need of new agricultural land, want of better education, and to start a family. All residents who have found their way to La Habana, and have noted that they intend to stay where they are. The main benefits stated of La Habana were opportunity and access to education. Residents also saw value and ease of being close to a road- including access to hospitals and a smaller population of bugs. Most residents claimed that the road itself was not a reason why they moved to La Habana and that they could manage without it. With this being said, most of their livelihood strategies depend on the road (mototaxi driving, selling fruit to passing cars…). Most La Habana residents have decided to stay in La Habana because of the education of their children, the ease of traveling to the cities of Iquitos and Nauta, and the agricultural land that they already work on.

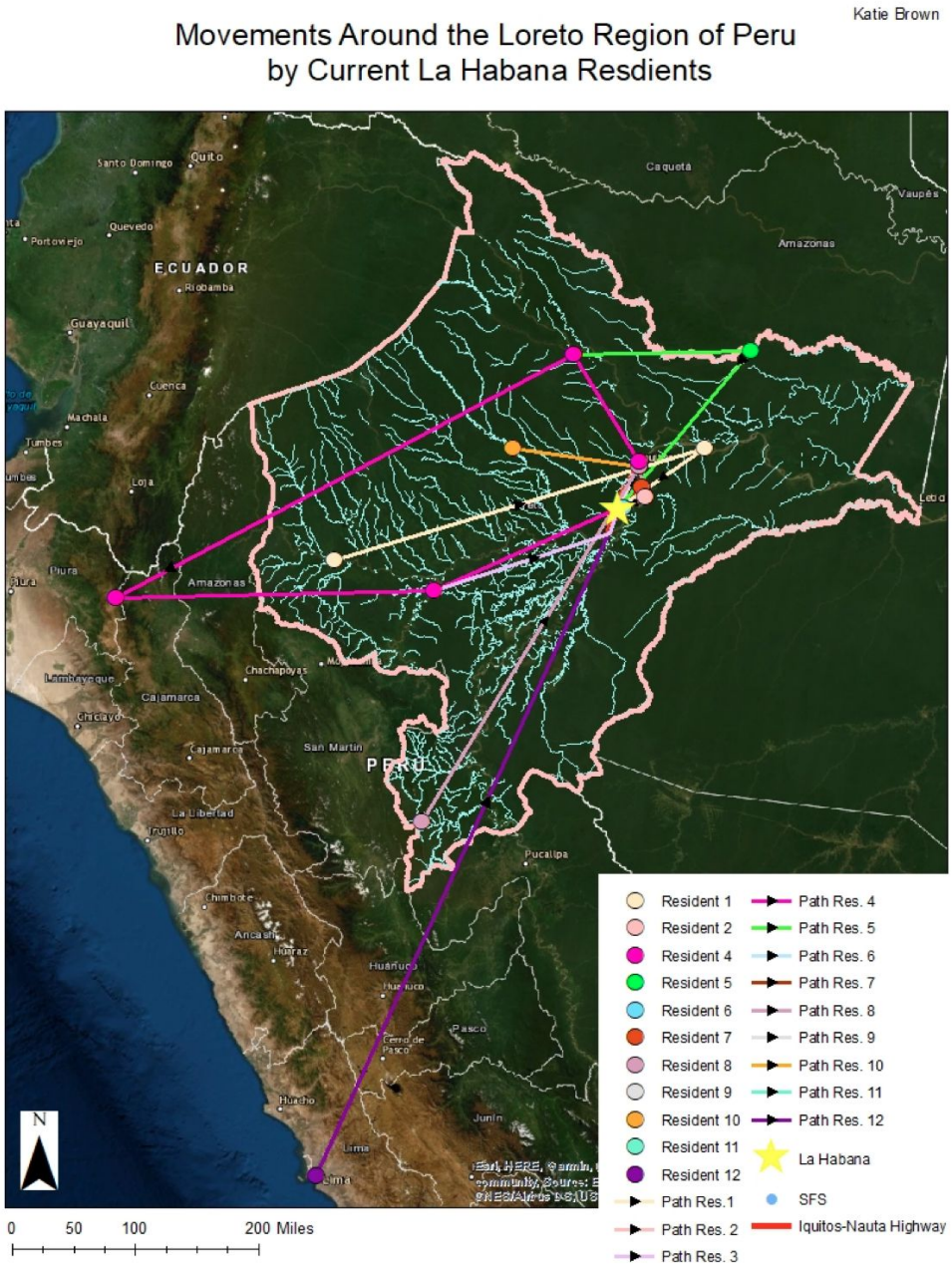


Figure 9: This map shows the answer to the spatial question: *What are the movements and changes of residential location of individual residents of La Habana throughout their lifetime?* La Habana residents have moved between two and five times throughout their lifetimes. Each color represents an individual and each dot represents a place where that individual has lived. The lines represent movement from place to place, and each line ends at La Habana.

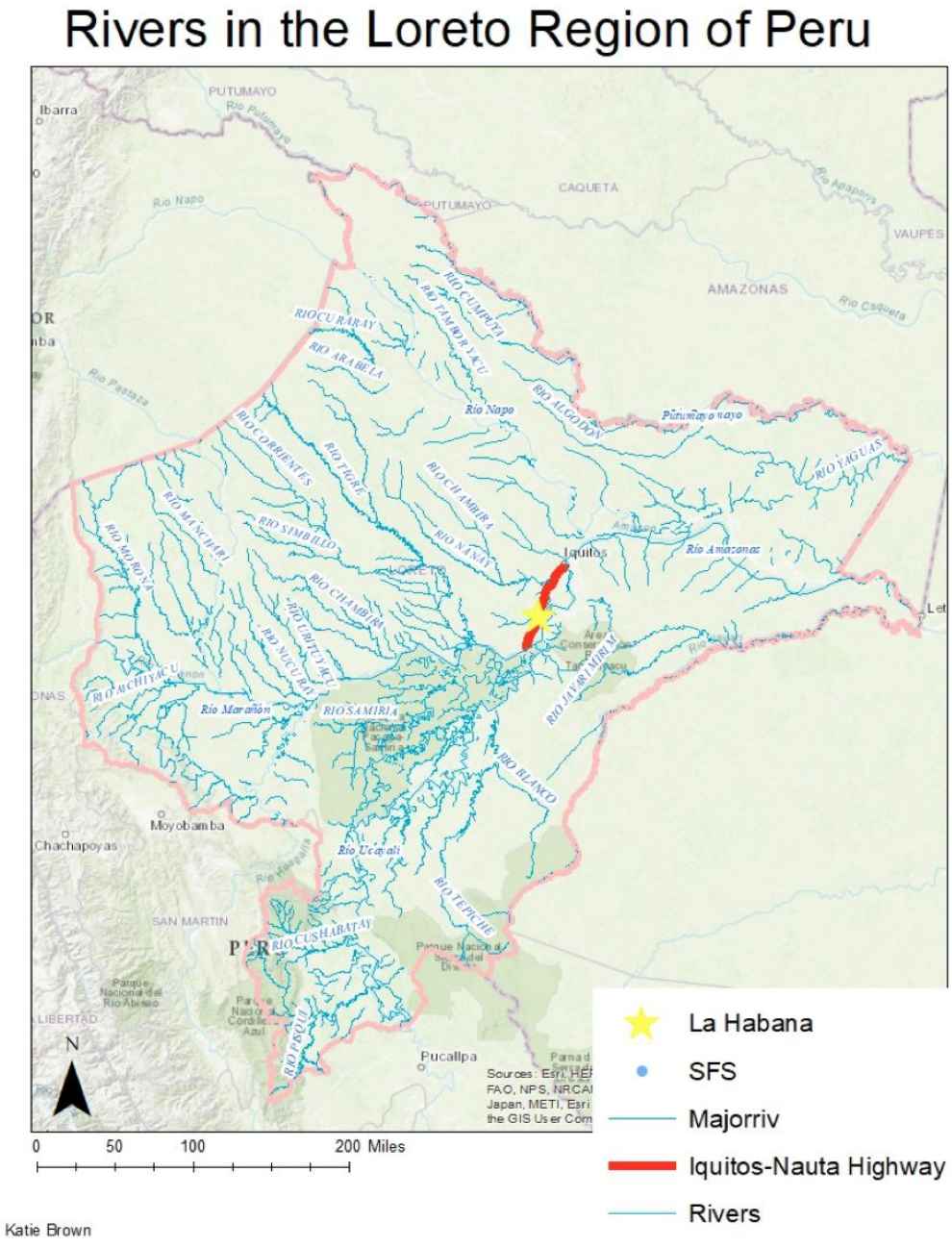


Figure 10: The river systems in Peru are extensive and a common route of travel for most residents in the Peruvian Amazon. The river layers is made of three shapefiles.

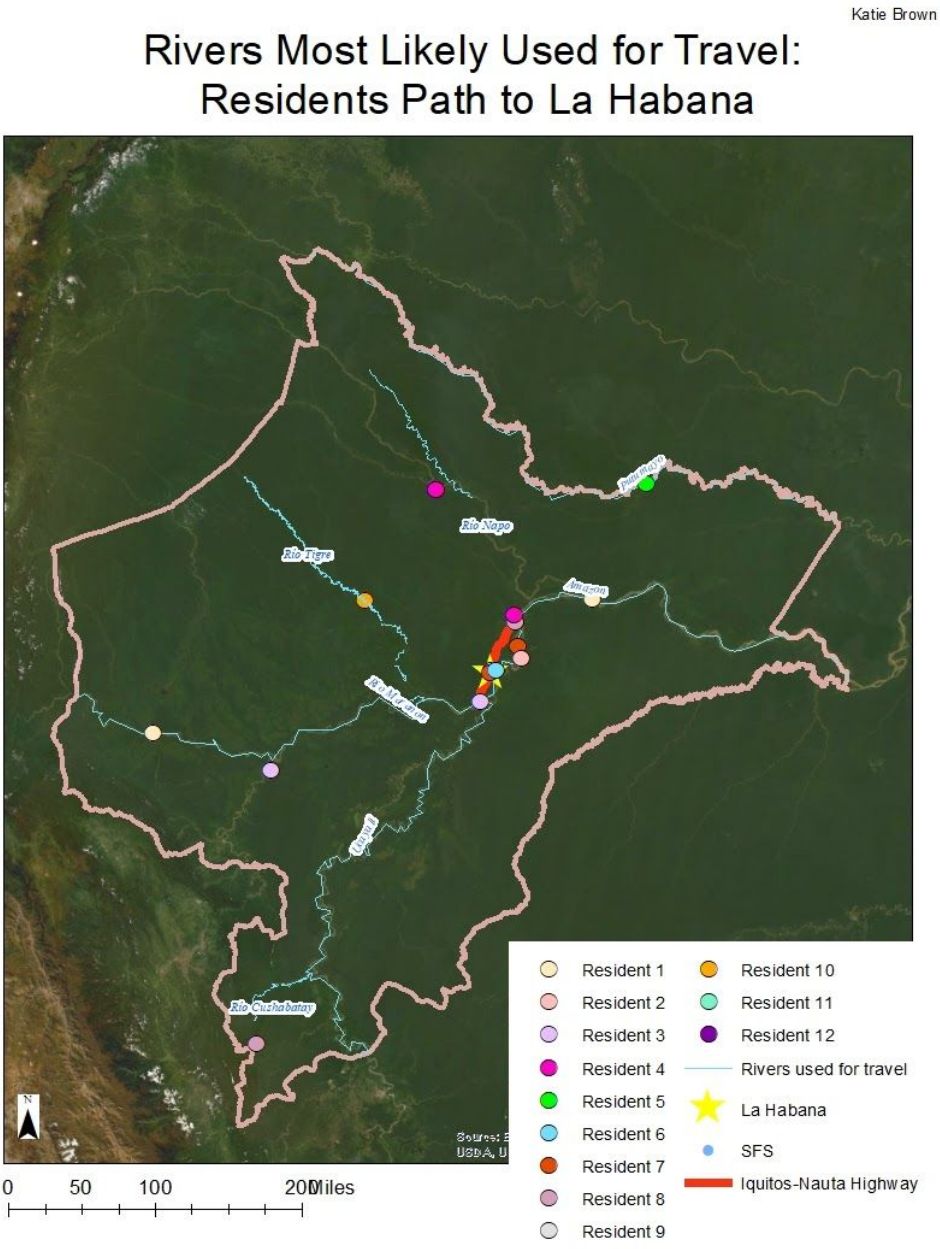
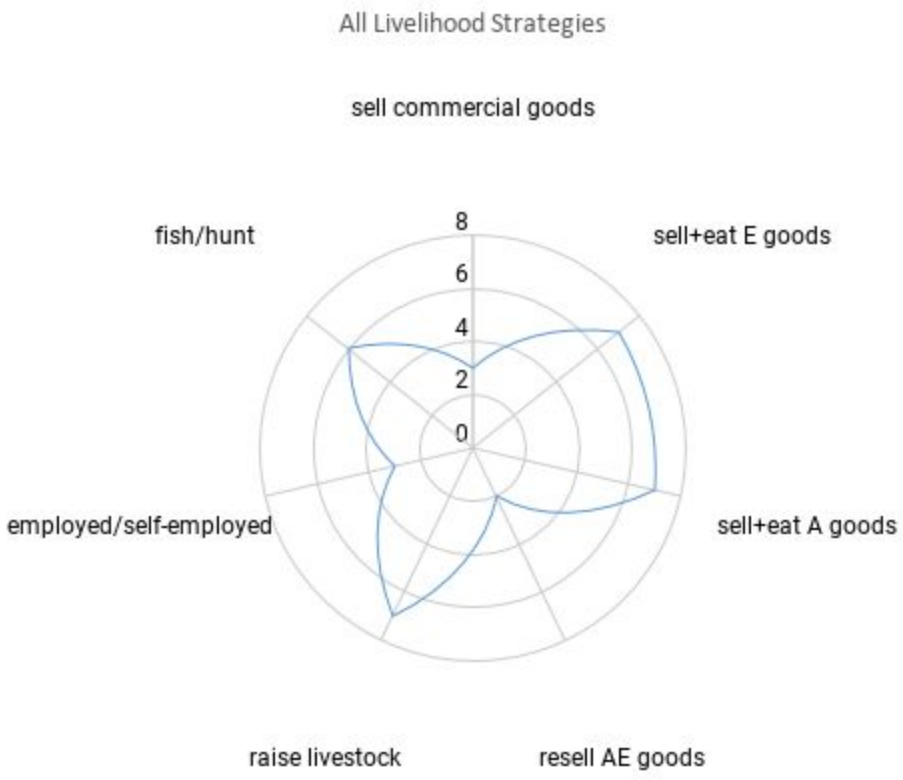


Figure 11: The rivers that are most likely used for travel are the Marañon, Putumayo, Amazon, Tigre, Ucyali, Cushabutay, and Napo. These rivers were chosen by looking at the location of the dots and the rivers that lead towards La Habana and the Iquitos-Nauta highway.

Commodification of Nature and Social Life

We observed several effects of the road on livelihoods in La Habana. Households in La Habana often rely on a number of different livelihood strategies with one primary source of income supported by a diversity of supplemental incomes and subsistence practices (Figure 12). In the context of this paper, a livelihood strategy is defined as anything a household does to sustain themselves, whether it be with monetary income, or growing food to eat themselves. All households we interviewed had some monetary income.

A)



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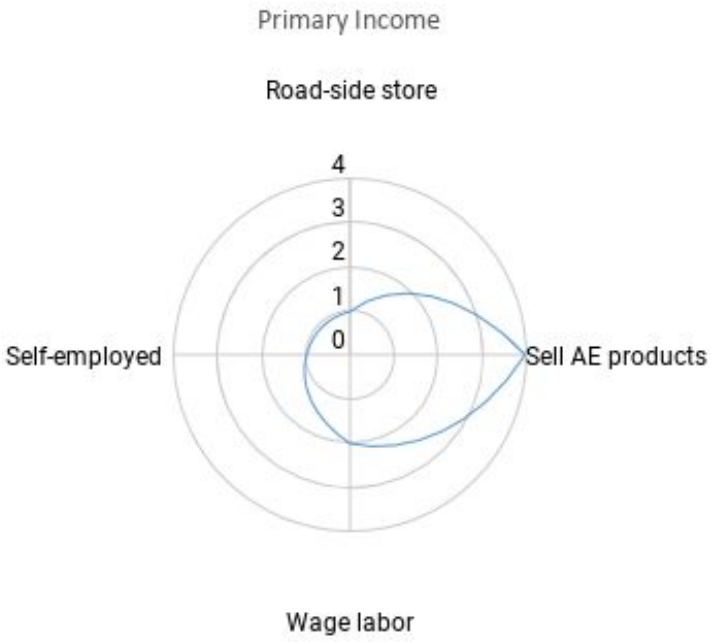

Figure 12: Livelihood and income strategies used by La Habana residents represented by the number of households which reported utilizing each method. Only data from residents in the urban center was counted. E codices extracted products, A codifies agricultural goods, and AE codifies agriculture and extraction. The one self-employed resident drives a mototaxi, which he bought and owns. **(A)** focuses on all livelihood strategies used and shows the commonality of every livelihood strategy employed by 12 interviewed residents across 8 households. **(B)** focuses on the primary income for each household and shows how many respondents used each livelihood strategy as their primary source of income out of 8 households.

Some of the greatest changes we found since the construction of the road were changes in livelihood strategies, specifically a shift in balance between extraction, production and commerce. Broadly, we found a major shift in balance between subsistence and monetary income. First, we learned that most of the agricultural and extracted products (plantains, yucca, various fruits, wood, botanical medicines, *irapay*, etc.) are the same as those described from

before the road, suggesting that products utilized from agriculture and forests remain largely unchanged. The traditional practice of having *chacras,* then allowing the land to lay fallow, replanting it with fruit trees and other useful plants, is still practiced by residents. However, we found additional agricultural or forestry projects in La Habana likely resulting from its spot on the road, including an NGO-sponsored reforestation project and the creation of fish ponds. Second, while we were informed that every resident in Nuevo Progreso had a *chacra*, only about half our interviewees reported having a currently producing *chacra*. Third, the agricultural products of La Habana are now mostly for sale rather than consumption. Every resident we spoke to who had a *chacra* reported that they sell everything they grow, keeping only the smallest fruits for their own consumption. Those who operated fruit stands also bought much of the fruit from others to resell at a higher price. The small livestock, such as chickens and ducks, kept by the majority of the residents were also primarily for sale rather than consumption. No one we spoke to in La Habana practiced agriculture solely for subsistence.

Every household we spoke to bought the majority of the food they ate. For the most part, even meat and fish are bought, and people only go hunting and fishing on occasion. Something we heard consistently is that wild game and fish are no longer as abundant as they were before the construction of the road. As one older resident put it in order to find animals to hunt, "you need luck." According to another resident, it used to be the case that everyone hunted and fished solely for themselves, telling stories of her father bringing home huge baskets full of birds for them to eat. Now everybody hunts and fishes to sell, reenforcing the broad finding that livelihoods have switched from subsistence to monetary.

Both households we interviewed in Nuevo Progreso informed us that their town relied more on subsistence practices than did La Habana. They hunted and fished solely for their own consumption and reported that their agricultural products and livestock were primarily for consumption. Many people in Nuevo Progreso grew their own rice, and unlike La Habana, people in this *caserío* also raised pigs. La Habana residents informed us that pigs had become too costly to feed for the price they received for the meat. Nuevo Progresso acts as the rural counterpart to La Habana, not yet as influenced by the increased urbanization in the Peruvian Amazon.

The road and the economic opportunities associated with it have shifted focus to making and spending money. People reported that there were now more goods that they needed to buy, including gasoline, pre-packaged food and electricity. Before the road, soap, sugar, rice, school supplies and clothes were the only goods people mentioned buying. The comfort and security enjoyed by those living close to the road costs more money. Additionally, the road has made access to city markets easier, encouraging people to sell. According to the people of La Habana and even Nuevo Progreso, it used to take a whole day to move products to Iquitos. The increased access to markets is the reason that the agricultural and forest products people once used mainly for subsistence became merchandise. Thus, livelihood does not stem directly from the community itself but from larger markets. The *caseríos* lose some autonomy over their food and other goods. The loss of autonomy in livelihood is characteristic of capitalist socioeconomic structures because it demonstrates not only that food and wood become goods, but that people are becoming separated from what they produce in a process called alienation (Caceres 2015; Stillwell 2002). Essentially, people have become reliant on selling goods in order to buy other

goods. More specifically, people now sell food products they produce themselves to buy other food products for their consumption.

Even the land the products are grown on becomes commodified, removing the residents from the means of production. The agreements between caretakers and absentee landlords provide a strong example of this. Furthermore, while the La Habana residents still use the untitled forest land within the urban center to extract resources for personal or family use, the residents are aware that this will no longer be the case if the land is privatized.

As land, plants and animals become commodified, La Habana and the surrounding communities could potentially see cultural changes as well. Reduced dependency on traditional subsistence practices and increased dependency on commercial markets could lead to future cultural change, specifically, a change in perception of nature from a subsistence lens to a commercial lens. That being said, currently, every resident we spoke to, and young children, demonstrated a wealth of knowledge about the world around them, identifying and multitudes of plant species and describing their uses, including which are edible and medicinal.

We also observed the beginnings of commodification of social life. Education, for instance, exemplifies this process. Education was very important to everyone we spoke to. When discussing their hopes for the future, two fathers independently said they simply want their kids to study. It seemed to be the path to success for children in the eyes of their parents, and accordingly access to education was a big draw to the *caserío* even before the road. One resident described how they were given advice to move to this area for greater access to education or,

"*tus hijos van a ser nada… siempre con machete*" translated as "[without education] your children will be nothing… and will always have a machete in their hands".

This dialogue may be part of a larger pressure to move the focus of social life from subsistence and production to being part of the workforce. Many adult children of the La Habana residents we interviewed moved away from the *caserío* after finishing school, and many currently reside in large cities like Lima and Iquitos, where urban lifestyles are completely dependent on monetary income. Additionally, we heard from an older resident that younger people are seeking wage labor more frequently than their parents' generation. The increase in societal value placed on wage labor above communal or familial agricultural work in addition to the emphasis on ownership of capital is indicative of this commodification and, more broadly, the intrusion of capitalist economic structures.

Commodification of social life could potentially lead to further cultural changes in the form of movement towards individualistic thinking over collectivism in the future. However, at this point in time, despite the individuation that comes with the division of private individual lots over communal land and the new emphasis on monetary income, current social practices remain collectivist, and overall there is a sense of community as a source of strength. For example, there are communal *mingas*- or community service events- every 15th and 30th of the month and a communal fund in case a resident needs help with a personal emergency. Residents still trade and sell things amongst themselves and seek to remedy conflicts internally through the *teniente gobernador*. Even as they seek individual titles, they are doing it together through their elected official, the municipal agent.

Development and Attitudes of Progress

Our study confirms the idea that the road and its effects are associated with idealized images of development. Development has become a buzzword (Rist 2007) that has more to do with idealizing Western culture than expressing any concrete meaning (Christofferson 2018). Past research into the Iquitos-Nauta highway supports the idea that infrastructure brings economic changes as well as the social services associated with "opportunity" and "development" (Harvey and Knox 2015). The idea of institutionalized property rights, as newly introduced into the Iquitos-Nauta area, may also factor into this image as security of property rights correlates with the income per capita of a region or country (Kerekes & Williamson 2010). Accordingly, even if it was not the central focus of what the interviewee was saying, we often heard words such as "*desarrollo*" when asking about the benefits of their location by the road as well as their hopes for the future (Figures 13 and Figure 14).

In connection, we encountered a tight association with progress as predicted by Hemmings (2008) and Harvey & Knox (2015). This is associated with the idea that there are stages of development in terms of socioeconomic growth that societies at a subjectively lesser stage must pass through to reach the ideal of what modern living should be based on a Western-biased, capitalist socio economic perspective (Christofferson 2018). For the people of La Habana, they perceive the changes in their lifestyles as progress because the road has brought them benefits they did not previously have. It has allowed them to move towards an idealized image of what development should be and the status that comes with it. All of the benefits they described fit into this image of developed, "modern" lifestyles: electricity, paved streets, modern medicine, businesses, education, computers and phones (Figure 8). Correspondingly, opinions of

the road in La Habana were all positive and while most *moradores* conceded there were pros and cons as with everything, one *morador*, who has resold commercial goods in the area since before the road, insisted the road was solely advantageous.

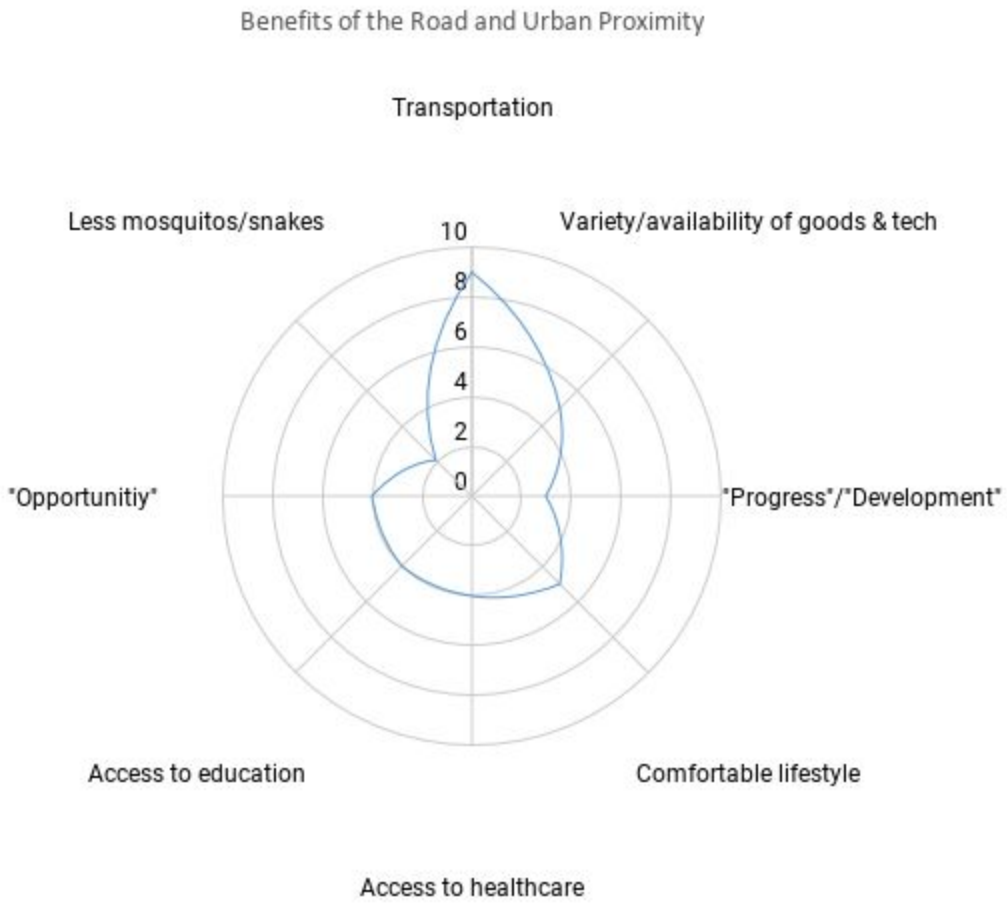

Figure 13: Benefits brought by the road and its connection to cities as perceived by La Habana residents presented as the number of individuals who discussed each topic out of 13 individuals who had a response.

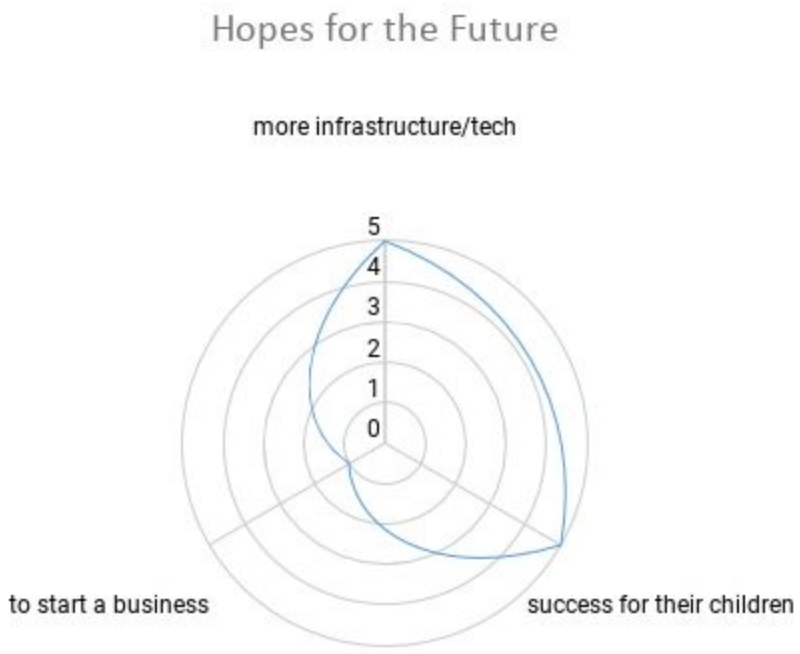

Figure 14: The hopes for the future of the La Habana community as well as individual endeavours of La Habana residents as presented as the number of individuals who discussed each topic out of 13 individuals who had a response.

These attitudes are echoed in people's reasons for moving to La Habana (Figure 15). While the majority of La Habana residents we spoke to originally moved here to be closer to family, all of those were the residents who had been here longer than the road. For those who came as the road was nearing completion or already completed, all interviewees cited benefits they associated with the road, such as access to education, opportunity, work, more comfortable lifestyles and amenities. The only exception is the household that moved from the Colombian-Peru border to escape prevalent drug violence.

The benefits brought by the road are not insignificant. For instance, safety, especially in terms of access to emergency services, was discussed at length. One resident told us a story about her sister who died of a snake bite long ago and contrasted it with the tale of a man who was bitten during the road's construction and survived due to more rapid access to life saving medical care that the road provided. She also described how she used to have to swim to school on occasion, telling us that her children didn't have to suffer like she did because of the road. Residents noted that the road was worth the potential danger of traffic and slight increase in crime. However, the municipal agent mentioned the idea of working with an NGO to install speed bumps near the residential area. This exemplifies a larger drive for the *caserío* to keep improving. When we opened up the conversation so that they may ask any questions of us, many residents asked about how things were in our own hometowns, assuming the United States as an example of a developed society, wanting to know what they could learn from us that could be implemented in La Habana.

Again, we saw a large focus on the future of the *caserío's* youth. The municipal agent described his ultimate goal for the future as using the loans to invest in local infrastructure, in the hopes of attracting more residents and businesses so that La Habana can qualify for services like running water, electricity beyond the first few houses, and a secondary school. However, here we begin to notice a pattern; the reason the municipal agent says they need running water is because the river is now polluted by the road and the large operations it attracted. The car exhaust may decrease the amount of mosquitos, as some residents mentioned, but according to Harvey and Knox, malaria gained footing in this region due to the road construction project (Harvey & Knox 2015).

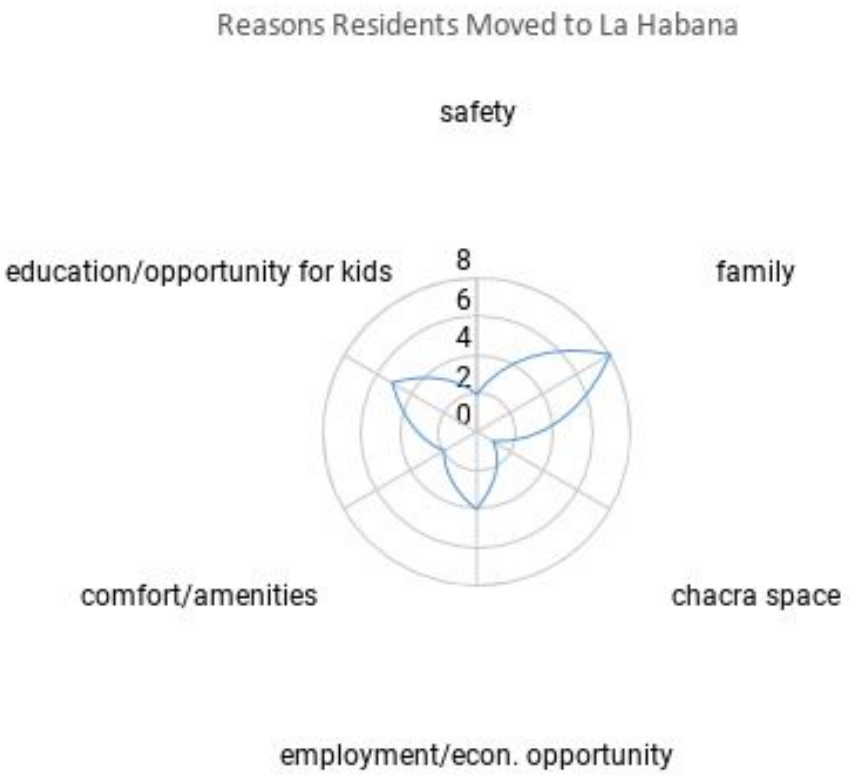

Figure 15: Features that drew residents to the caserío La Habana as reported as the number of individuals who discussed each topic out of 13 individuals who had a response. Responses are not mutually exclusive, some residents mentioned more than one feature as a reason for moving to La Habana.

It was outside the scope of our interviews to ask about the resident's knowledge of these facts or if they change any opinions, but nonetheless we encountered a belief in the opportunity and possibility of the new system that came with the road. There certainly was not an increase in trust in the government as a result of the public sector road project, confirming what has been found in other studies (Harvey & Knox 2015; Kerekes & Williamson 2010). One La Habana resident even asked us what it was like to have a government that wasn't completely corrupt. Another lamented that the government needs to invest more into the people who actually use the

land. The residents we spoke to in Nuevo Progreso similarly did not seem to have much faith in the government. However, La Habana residents believe they can use the new system to improve the *caserío* and their lives here. For example, the municipal agent and others have mentioned working with NGOs to accomplish a number of public works projects. Few respondents mentioned cons in association with the socioeconomic and institutional changes that came with the road unless prompted, and those who did held that the benefits outweighed the costs (Figure 16).

Figure 16: Current problems or challenges facing the area as reported by La Habana residents presented as the number of individuals who discussed each topic out of 13 individuals who had a response.

Many noted the depletion of natural resources and environmental damage. However, these residents seemed to view that as part of the change in lifestyle from rural to urban rather than a larger problem. Nearly every resident we spoke to described the wealth of nature that existed in this and other rural areas of the Peruvian Amazon, listing off infinite species and expressing love of the jungle. These places still exist, but when asked why they stay in La Habana, people reported being comfortable and accustomed to where they are now. One resident, who originated from Reserva Nacional Pacaya Samiria, described his hometown as somewhere one does not have to *buy* fish; in La Habana you *have* to buy fish. Nearly all residents discussed how they loved their subsistence-based lifestyles in the jungle, describing it as "*linda*," and "*la vida tranquila*." However, one current La Habana resident and former Nuevo Progreso resident pointed out that the tranquil life he missed from Nuevo Progreso no longer existed in the same way. Another said that there was no economic opportunity in Nuevo Progreso.

More rural small communities away from the road reported more negative impacts. In Nuevo Progreso, the depletion of fish and other resources is felt more strongly because residents rely more heavily on them for subsistence. The road has allowed for more outsiders to have access to their land to hunt and fish on, but they have been excluded from other benefits such as 24-hour, rapid transportation. It is hard to sell and make money in rural communities. Changes in national school policies have also placed pressure on these communities and their populations are declining, possibly in connection with larger trends of decreasing rural and increasing urban populations in Neotropical zones (Lopez-Carr & Burgdofer 2013).

The residents of La Habana exhibit agency in responding to development pressures. Although they are called the "invisible Amazonians," they do not see themselves as victims. The

imposition of new systems and conceptions of land, nature, and social life have created a develop or die type of scenario in that this new reality will not support their old land use practices and livelihood strategies, so they must change with their environment. They are adapting to the imposition of a new system, which has not only changed their livelihoods but also determines how small communities can organize and use land as well as which benefits they are eligible for—such as education, electricity, and running water—based on the number of residents. They are seeking titles to secure their foothold in this new environment to the best of their ability and have arranged their new livelihood and land use strategies to get the most out of their situation.

We believe that our findings are generalizable to the Iquitos-Nauta area and may have stock in the greater issues of privatization, commodification of nature, economy, and development in small rural communities. Given the sizable number of road and infrastructure projects planned in the Peruvian Amazon and the Amazon at large, continued research in this area may be critical in discussions of the region's future. We suggest that the case study of La Habana continues to be investigated by the Center for Amazon Studies in the long term not only to continue the exploration of our questions, specifically to advance our understanding of land use and legislation in the area but also to monitor changes in the *caserío* post-titling. Other directions could include an investigation of the effects of the introduction of commercial goods into local diet and prevalence of "diseases of development" and an exploration into the changes of female roles in the context of the recent changes in livelihood strategies.

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Appendix

Table One: Research Matrix

This research matrix was created before our research began as a guide for what my research team and I wanted to accomplish. This outlines our main objectives, specific research questions, and how we planned on obtaining answers to these questions. The sub-questions helped us create our semi-formal interview guide. The matrix helped us stay on-track and focused throughout the research project, ensuring that we were answering the questions we sought out to find.

Main Objective	Research Questions	Sub-questions	Methods
We seek to understand the impacts of road construction and land titling on rural livelihoods, land use, and social relations in La Habana, a *caserío* along the Iquitos-Nauta highway	How is land used in La Habana?	Do people in La Habana have *chacras*? Where are they? How big (in hectares) are they?	Semi-formal interviews; *chacra* visit; participatory mapping
		What do people grow in their *chacras*? Do they grow food for subsistence or for sale?	
		When and how did people acquire their land?	
		Are people's *chacras* for agriculture? Do they have forest there? What kind of forest? Do they have livestock or chickens/ducks? Fish ponds?	

		Are there communal spaces in La Habana? Where are the houses and schools and other structures located?	
	What are the livelihood strategies of residents of La Habana?	How do people earn money? Do they sell agricultural products? Have a store? Earn wages?	Semi-formal interviews
		How many people earn income in the household?	
		What jobs have people had in the past?	
		What things do people spend money on?	
	How are people in La Habana socially organized?	How many people live in each household? How many children do couples have?	Semi-formal interviews; participatory observation
		How old are the residents of La Habana?	
		Do any residents hold any political roles/positions? If so, what do they entail?	

		How is La Habana connected to other places? Through trade and sales? Travel?	
	How does the road impact La Habana?	What are people's general opinions on the road in La Habana?	Semi-formal interviews; timeline creation
		What are some specific benefits and drawbacks of the road's presence in La Habana?	
		Was there a road near to where people came from (hometowns)?	
	What is the historical background of La Habana?	What is the local history of the area?	DISAFILPA key informant interview; semi-formal interviews; participatory mapping; creation of timeline
		When did infrastructural development occur in the area?	
		What major events occurred in la Habana? Politically? Infrastructurally? Services?	
		Where do individuals come from? Where do they leave to?	

Table Two: GIS focused research Matrix

This matrix was created to organize the data needed to successfully create maps using ArcGIS.

This matrix laid out which data needed to be located in order to answer my research objectives.

DATA	DESCRIPTION	SOURCE
Past locations that current La Habana residents have lived and are from- data showing how residents have moved around the Loreto region of Peru throughout their lifetimes	Where did the current residents live before moving to La Habana? How many locations have they recorded living over their lifetimes? Where were their parents and grandparents from? This data will be used to answer the spatial question (1)	My research notes from the semi-formal interviews. I put this into GIS and digitized the data for each place that a person has lived within their lifetime. I connected "connect the dots" by tracing the likely path taken between places of residence. The data will be anonymous.
Why residents moved towards the road	Benefits of the road and draws to the community of La Habana. This data will be used to answer the conceptual questions (3) and (4).	My research notes form the semi-formal interviews. This will be added to my presentation as text or presentation, not as a part of the map.
Background maps of the Iquitos-Nauta highway and the Loreto region of Peru.	This map will serve as the source of the Iquitos-Nauta highway imagery, as a background for the rivers layer, and as the place where the symbology for where people have resided in the past is placed.	I will download a background from ArcGIS online backgrounds. I will choose the world imagery map with resources because it is updated satellite image that shows the completed highway.
Rivers in the Loreto region of Peru	Location of each river in Peru, specifically in relation to places where La Habana	https://databasin.org/datasets/a69cfebe720e46c0b2ddc93d5edaf368

	residents have lived. Rivers are the most likely form of travel because there are no roads in this area of Peru (other than the Iquitos- Nauta highway) I will digitize the assumed paths of travel to answer question (2).	This website allowed me to download a lpk layer called "Peru Rivers" that opens on ArcMap as a layer. I also downloaded a layer called "Major World Rivers" from databasin.org and clipped the rivers to the Loreto region of Peru. I combined the layers for a complete look at the Peruvian River system. I did this because the original layer was missing several of the major rivers. I used this layer to digitize likely travel paths with. I found the places people have resided in the past and "connected the dots" using the path of the major rivers in the area.
A shapefile of the Loreto Region of Peru	I need this to be able to clip the rivers layer to the correct region and create boundaries for the region in which I am studying.	https://www.arcgis.com/home/item.html?id=3c383160562640658679b6b799cbc7c This website allows me to download the Peru administrative boundaries (including that of the Loreto region). I used this layer to clip the river systems to.

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